The Resource
for Environmental Education in Missouri
October 2001 • Vol. 4 • No. 1

Tales Unraveled, Myths Debunked

By: Regina Knauer, Education Consultant, Missouri Department of Conservation

Oh, those "wives" and their old tales! Of all the forms of oral tradition, why are the stories spun amidst the swirls of ebbing hearth fires and superstitious fears the ones still aswirl today? Admittedly, nighttime for those huddled beside a hearth was dark–terribly, horribly, deeply dark–yet they could sense creatures calling, crawling, flying around easily within it. But daytime had its share of unseen inhabitants as well, dwelling in deep, dense forests barely lit with misty filtered light. Those whose woodland, pre-scientific, pre-electricity superstitions centered around dread of the unknown and unseen are more easily forgiven for their fears. It is harder to excuse the modern, educated, computer-literate masses who continue to cling to and pass along the same medieval superstitions and fears, the same old wives' tales: night, clothed in its impenetrable shroud of darkness, unleashing silent horrors: owls (familiars of witches); bats (in league with "forces of evil"); graveyards and cemeteries (haunting havens for revengeful, restless souls).

The truly innocent and unwary victims found by moonlight or sunlight–the poison ivy, hemlock, and witch hazel; the owls, bats, spiders, and snakes; the caves, swamps, and cemeteries–are merely misunderstood, misrepresented plant and animal species (and their habitats) eking out their existence in niches for which they are admirably adapted. These plants may "rub you the wrong way" or have "spooky" names, but they provide food and shelter for wildlife. These animals are the "good guys," predaceous in ways that prove beneficial to us as well as to them. [If they disappeared, would we be willing to eat all the insects and rodents they consume daily?] And where better to discover venerable, old trees and tiny, jewel-like pockets of historical and endangered flowers than amid the weedy trails and nooks and crannies of old cemeteries.

Ah! And now 'tis the season for even the most learned biologists and pragmatic scientific scholars to cast aside knowledge and truth for an opportunity to decorate a front porch, a window, a classroom, a child, perhaps themselves or a spouse with fearsome, ghoulish, ghastly representations of these denizens of fear and their haunting habitats. And why not? It's a perfect way to face up to our fears, to be that which we fear, and to overcome our fears.

continued on page 6...

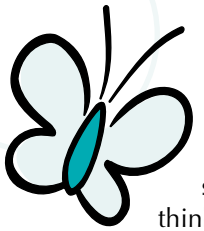
What's in it for you?

An entire issue devoted to
Myths & Mysteries

Long Live Plants

By Carol Davit, Natural History Special Projects Coordinator, Missouri Department of Conservation

Would you want to live in a world without fall color, pumpkins or apple pie? Without books or wood for making fires? By converting the sun's energy into plant material, plants provide us with things that we use and depend on every day: oxygen, clothing, perfume, paper, lumber, coal, carbon dioxide processing, and food for people, livestock, pets and all other animals. Plants not only make life enjoyable for us, plants make life possible!



We can only survive if plants survive, and thankfully, they are able to perpetuate themselves through a tremendous variety of reproduction strategies. Even though spring usually comes to mind when we think of plants flowering and setting fruit, late summer and fall are good opportunities to learn about plant pollination, reproduction and seed dispersal.

You may have heard friends or family members complain about goldenrod making them sneeze in late summer and fall. But in fact, goldenrod pollen is not the culprit for autumn allergies. Goldenrod flowers have sticky pollen that is transported from flower to flower by pollinators like butterflies and bees—it is too heavy to be transported by the wind.

However, goldenrod blooms at the same time as ragweed, which has wind-pollinated flowers. The wind carries light-weight ragweed pollen not only from flower to flower, but into the noses of people, which makes them sneeze! Many plants depend on wind or insects like butterflies, bees and moths to pollinate their flowers, but others depend on birds, beetles and even bats. Pollination begins the process by which the ovules in a flower are able to develop into seeds.

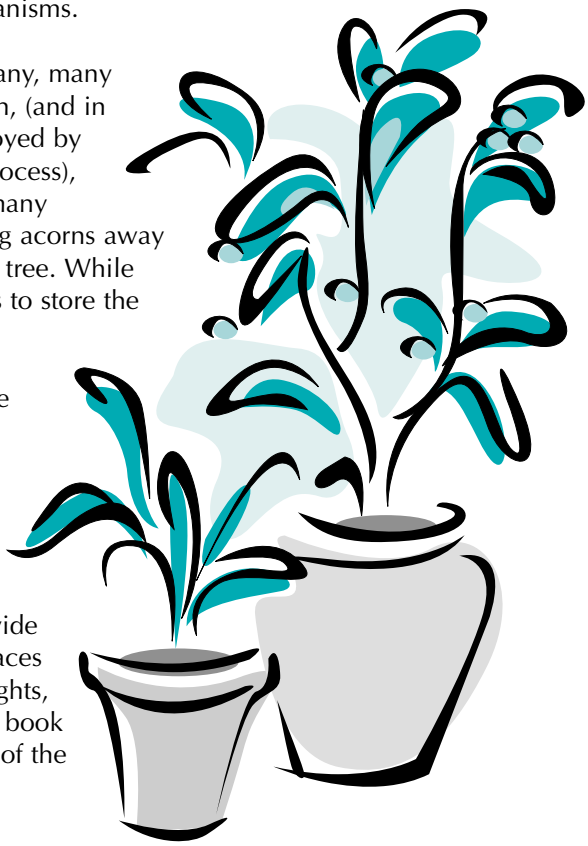
Oak trees also are wind-pollinated, and indeed are to blame for some springtime allergies. However, without all that oak pollen in the air, we would have no acorns in the fall. If you have ever sat under an oak tree in the fall, you probably were hit on the head more than once by a falling acorn. Depending on the amount of rainfall, soil fertility and other factors, a forest-grown white oak tree can produce an average of 10,000 acorns a year! (Silvics of North America, Burns and Honquala, Eds., U.S.D.A. Forest Service, 1990) Acorns are the fruit of oak trees, consisting of the seed inside the hard acorn shell and the acorn cup.

To ensure successful reproduction, most plants must disperse their seeds as far from the parent plant as possible. Many plants have fancy ways of dispersing their seeds.

Pumpkins, apples, persimmons and other fruits that we consider edible are tasty for a reason: the fruit flesh tempts not only people but other animals to carry fruits away from the parent plant and discard the seeds in a place where they might grow into a new plant. Some seeds will only germinate after passing through the digestive system of an animal.

Other plants have seeds without tasty flesh but with ingenious devices for traveling. Maple seeds that fall in late April are attached to what looks like a helicopter propeller, which flies the seeds away from the parent plant and lands in a place where they will hopefully germinate. Other plants have miniature parachutes attached to their seeds—like dandelion or blazing star—and also are dispersed by the wind. Others, like coconuts, have a husk that serves as a flotation device, allowing them be carried by ocean currents.

So why do acorns just plop straight down from the tree? Like some other fruits, they are attractive food for animals like deer, turkeys and squirrels. These animals come to oak trees, so the oaks don't have to rely on other dispersal mechanisms.



Even though many, many acorns are eaten, (and in this case, destroyed by the digestion process), there also are many squirrels burying acorns away from the parent tree. While squirrels do this to store the acorns for later food, many of these caches are forgotten. As a result, new oak seedlings germinate and grow into trees, many of which will provide wood for fireplaces on chilly fall nights, and paper for a book to read in front of the fire!

Mysterious Places

Graveyard Spirits

By David J. Bruns, Conservation Education Consultant, Missouri Department of Conservation

Tall grasses shroud the weathered headstones of an old graveyard. If we could summon the spirits of this place, what messages would they have for us?

Perhaps they would tell of how they came to this country and saw opportunity: Expanses of natural meadow interspersed with timber-rich wooded streams abounding with fish and game. Perhaps they would tell of toil and hardships: The labor of turning the prairie top soil; the hard winters and the dangerous wildfires; the times of hunger and illness which left bereaving survivors. Perhaps they would also tell of a good life, closely connected with a land which provided for their needs with an intimacy hard for us to understand today.

In a few remarkable places, surrounded by land long converted to farmland or grown into forest, small patches of prairie are preserved in the very place that these brave people were laid to rest. Prairie cemeteries, such as the Old City Cemetery in Trenton Missouri are fitting living memorials to those who lived closely connected to this land. Perhaps these places also serve to remind us that the story of these pioneers on this land is not a myth; it is our heritage.

Did You Know?

An old Ozark superstition says that when any cedar tree which you planted grows tall enough to shade your grave, you will die. So commonly has **Redcedar** (*Juniperous virginiana*) been planted as ornamental in cemetaries, it is sometimes called graveyard tree.

Seepy Not Creepy

By A. J. Hendershott, Outreach and Education Regional Supervisor, Missouri Department of Conservation

Swamps have a creepy reputation. It has been my experience that most people would rather tolerate a bad visit at the dentist than visit a swamp. This is unfortunate because the myths surrounding a swamp do not mesh with reality.

For ages swamps have been viewed as useless places of doom. It is no coincidence that the mythological boogy man originated from the swampy bogs. Adding to the poor image are snakes, blood thirsty bugs and difficult travel. These things are often exaggerated tall tales. Truthfully, other habitats have as many dangerous creatures as swamps.

In reality a swamp is an area of land covered by slow-moving water, with plants growing in and around it. They provide numerous benefits including flood protection, water filtration, recreation, and habitat. Missouri's bootheel swamps are home to many unique plants and animals including the endangered alligator snapping turtle, three-toed amphiuma, swamp rabbit, mud snake, bald cypress, tupelo, and spider lily. If you use a little bug repellant and watch where you step you are guaranteed to experience a wonderful part of Missouri's natural heritage in a visit to the swamp.

Cave Dark

By Regina Knauer, Education Consultant, Missouri Department of Conservation

Cave dark is absolute–no light and no sight. But cave dark has sound–quiet drops each taking an eternity to drip and "redesign" limestone deep within the earth. In Missouri, cave dark is found well within caves or natural openings formed by water and carbon dioxide dripping down or water plus hydrogen sulfide rising up.

Cave dark conceals strange and beautiful stone formations known as speleothems which come in many shapes and patterns depending on the amount of water, how it entered the cave, and how it landed on the cave floor. Conical stala**c***tite*s (hanging "tightly" from the **c**eiling of a cave) and dome-shaped stala**g**mites ("growing" up from the **g**round) are often in the company of thin, wavy cave draperies, smooth, rounded flowstone, grey and white cave pearls, and spindly, lacy helictites.

Cave dark conceals equally strange and beautiful creatures as well. Animals that spend their entire lives in the darkest of cave dark have little use for sight, having small eyes or none at all, and rely heavily on smell and touch.

That cave dark may be frightening to many people may be a good thing for caves. They are fragile ecosystems formed over hundreds of thousands of years and destroyed in seconds by human carelessness. Caves are also indicators of the health of the world above them–what pollutes above will pollute below.

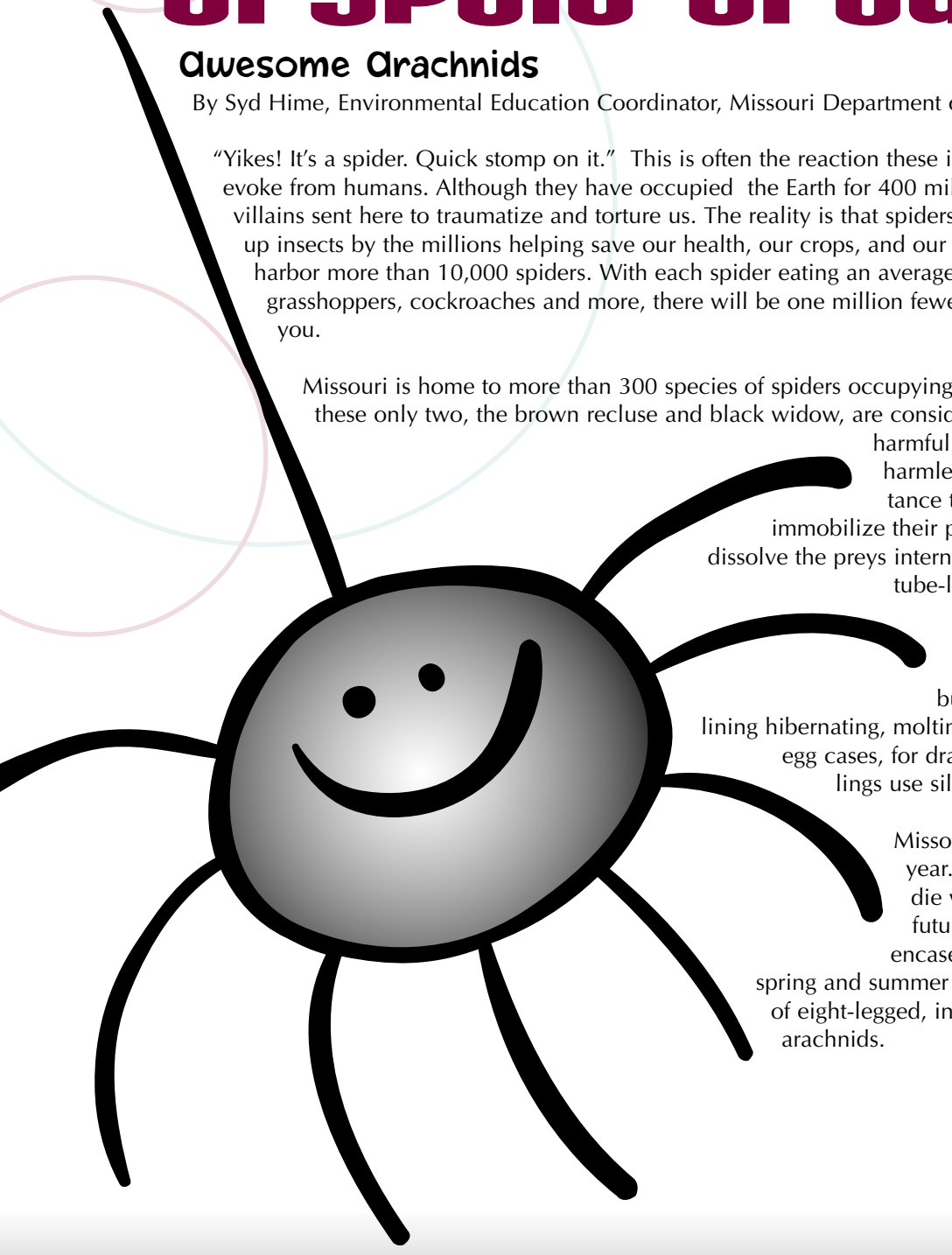
Experiencing a cave is an adventure into a cool, dark unknown, each lantern-lit passage a wondrous discovery, a reward for braving cave dark. Yet the greatest reward after a day of cave dark may well be the bright green world that greets you when you emerge.

Cryptic Creatures

Awesome Arachnids

By Syd Hime, Environmental Education Coordinator, Missouri Department of Conservation

"Yikes! It's a spider. Quick stomp on it." This is often the reaction these innocent, misunderstood, arachnid evoke from humans. Although they have occupied the Earth for 400 million years spiders are often viewed as villains sent here to traumatize and torture us. The reality is that spiders are extremely beneficial. They gobble up insects by the millions helping save our health, our crops, and our sanity. A single acre of habitat can harbor more than 10,000 spiders. With each spider eating an average of 100 insects a year including flies, grasshoppers, cockroaches and more, there will be one million fewer insects to buzz around and bother you.



Missouri is home to more than 300 species of spiders occupying virtually every type of habitat. Of these only two, the brown recluse and black widow, are considered to have venom that is potentially harmful to humans. Most spider venom is harmless to humans but is of great importance to spiders. They use their venom to immobilize their prey, while special digestive juices dissolve the preys internal tissues allowing the spider to use it's tube-like mouth to easily devour its dinner.

Spider silk is the strongest natural fiber in the world. Spiders use silk for web-building, capturing prey, sperm transfer, lining hibernating, molting, or living chambers and constructing egg cases, for draglines and mating bowers, and spiderlings use silk for windborne travel.

Missouri spiders rarely live longer than one year. Some hibernate in winter but most die within one warm season, leaving the future to an overwintering brood of encased eggs. Spiderlings emerge in the spring and summer bringing on a whole new generation of eight-legged, insect devouring, silk-spinning, super arachnids.

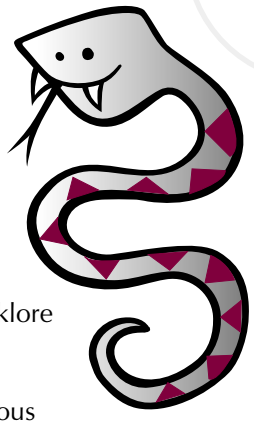
Did You Know?

Poison hemlock (*Conium maculatum*) was the plant used to poison Socrates, and is also commonly called bad-man's oatmeal, beaver poison, and wode-whistle. Native to Europe, the plant is now naturalized in the U.S. and occurs as a luxuriant weed, up to 10' tall along roadsides and in abandoned fields throughout the east. All parts of the plant are extremely poisonous.

Cryptic Creatures Continued...

Snakes Alive

By Syd Hime, Environmental Education Coordinator
Missouri Department of Conservation



Snakes! Just the word brings about a feeling of dread, fear, and terror to the minds of many. From the serpent that instigated the expelling of original man out of the Garden of Eden in Judeo-Christian tradition to Quetzalcatl, the feathered serpent and "fair god" of the ancient Mexicans snakes have entwined their way through human history and mythology. Pliny and Galen prescribed the eating of vipers as a cure for various ills. In parts of eastern Europe and the Middle East snakes were made welcome in farmhouses and allowed to live there as beneficent spirits. While in America the rattlesnake plays a major role in heraldry accompanying the motto "Don't Tread On Me." Locally a well-known folklore describes a kind of king snake that steals milk straight from the udder of a cow.

Despite all these human connections snakes are still often portrayed as slimy, slithering, vicious, dangerous creatures that can sting with their tongue and devour small children. Some snakes are dangerous because they are poisonous, while others have aggressive temperaments, and a few will emit a foul odor when handled. But the vast majority are colorful, harmless, beneficial in their pest control, and are in far more danger from us than we are from them. If you take the time to watch a snake you'll find yourself wanting to know more about these fascinating reptiles.

Owl "Myth-tery"

By Regina Knauer, Education Consultant,
Missouri Department of Conservation

> The owl, that bird of onomatopoetic name, is a repetitious question wrapped in feathery insulation especially for winter delivery.
>
> *Hal Borland, 1964, "Sundial of the Seasons"*

Owl history is rife with contradictory myths and mysteries. Just what (or whoooo) are owls? Is an owl a "fatal bellman" or the living embodiment of the Greek goddess of wisdom? Are they "death's dread messengers" or priests of prairie dogs? Even today, there are those whose perceptions of owls is clouded by persistent misinformation and superstitious fear and who are unable to see that owls are simply birds with some uncanny, amazing adaptations.

However, considered out of context, owl adaptations easily fuel superstitions and fears rather than illustrate a nocturnal life style. Here are birds with heads able to turn 270, human- sized eyes, lopsided ear openings, feathered facial disks, extremely sharp talons and hooked beaks, silent flight, the unnerving ability to dissolve and disappear into trees, and shrieks, screams, and screeches as varied and unexpected as the owls themselves.

Woe to the unwary evening stroller! But do owls give a hoot what people think of them? Probably not. But it would certainly be a good thing if people would stop fearing them and start appreciating them for what they are–highly skillful, efficient predators that are extremely beneficial to humans and...wise enough to sleep in and avoid the diurnal feeding crunch and then to take advantage of the slower, nocturnal "traffic" comprised mainly of small, quiet, tasty mammals.

Bonkers About Bats

By Syd Hime, Environmental Education Coordinator
Missouri Department of Conservation

Bats are blind, they get caught in your hair, they're dirty and carry rabies.

Historically associated with witches and vampires' bats have long been shrouded in this type of folklore and superstition. Perhaps it's their nocturnal habits, fondness for eerie places like caves, and silent, darting flight that has warranted them an undeserving bad reputation.

Bats in fact have good vision, an echolocation system sophisticated enough to detect and avoid objects as fine as a single human hair, are more closely related to primates than rodents, and are very clean, grooming themselves several times a day. While rabies is a serious disease, it occurs only in a small percentage of bats (less than 1/2 of 1 percent).

Missouri is home to 14 species of bats, including two endangered species: the Indiana bat and the gray bat. During the day they roost amid the leaves of trees, under loose bark or in caves. Emerging at dusk, they go about the job of catching their food. Missouri bats are insectivorous, feeding exclusively on flying insects. They capture their prey with their mouths or by scooping them into their wings or tail membranes. In other parts of the world bats feed on fruits and flower pollen.

Bats contributions to pest control, seed dispersal, pollination, and the nutrients their guano provides for other cave dwellers, makes these "furry angels of the night" an important asset to our environment.

Tales Unraveled
Myths Debunked

...continued from cover

This October, why not lend an air of mystery and wonder to these "most fearsome" plants, animals, and places and in doing so, give your students, your children, yourselves an even better opportunity to solve the mysteries, unravel the old wives' tales, debunk the myths, face up to fears, and look askance at the superstitions and anew at the truth–fearlessly!

Project Resource Guide: *Myths & Mysteries*

Project Resource Guide: Myths & Mysteries
Looking for activities that connect to this issue's theme? Here's a whole list of ideas from Project WILD, Learning Tree, and WET. Covering a wide range of ages and format all are interdisciplinary and guaranteed to excite your students about Myth's and Mysteries. If you do not yet have these materials, sign up for a workshop by contacting the coordinators listed.

PROJECT WILD

Interview A Spider - Page 14 - Discover that wildlife ranges in size and occurs in a variety of forms, colors and adaptations.

Spider Web Geometry - Page 58 - Recognize spiders as wildlife and generalize that people and wildlife share similar environments.

First Impressions - Page 224 - Distinguish between reactions to an animal based on myth or stereotype and those based on factual information.

And the Wolf Wore Shoes - Page 226 - Distinguish between real and imaginary animals and identify characteristics of both.

Saturday Morning Wildlife Watching - Page 228 - Discriminate between realistic and unrealistic portrayals of animals in cartoons and identify possible influences on people's perceptions of wildlife from watching cartoons.

Changing Attitudes - Page 240 - Describe factors that may influence changes in attitudes related to wild animals and/or the environment.

Mermaids and Manatees - Aquatic Page 44 - Distinguish between mythical and actual aquatic wildlife and describe how imaginary creatures may be inspired by real animals.

Wetland Metaphors - Aquatic Page 54 - Discover the unique characteristics and importance of wetlands.

For more information on Project WILD and Learning Tree workshops and materials contact: Bruce Palmer, State Coordinator, Missouri Dept. of Conservation, PO Box 180, Jefferson City, MO 65102-0180, (573) 751-4115 extension 3113, <palmeb@mail.conservation.state.mo.us>.

PROJECT Learning Tree

Charting Diversity - Page 27 - Explore the amazing diversity of life on Earth and discover how plants and animals are adapted for survival.

Can It Be Real? - Page 31 - Discover extraordinary plants and animals and gain insight on how they are uniquely adapted to environmental conditions.

Tale of the Sun - Page 56 - Examine stories from other cultures and what they reveal about the beliefs and history of the people who tell them.

Germinating Giants - Page 234 - Sharpen math skills by comparing local trees to the world's largest trees.

PROJECT WET

What's the Solution? - Page 54 - While investigating the dissolving powers of water, students solve a crime.

Super Sleuths - Page 107 - Discover the diversity of waterborne illnesses and the role of epidemiology in disease control.

A Grave Mistake - Page 311 - Analyze data to solve a mystery and identify a potential polluter.

For more information on Project WET workshops and materials contact; Joe Pitts, State Coordinator, Missouri Dept of Natural Resources, Technical Assistance Program, PO Box 176, Jefferson City, MO 65202, (800) 361-4827

The Library

Conservation and Environmental Education Resources

Web Resources

Bat Conservation International

<http://batcon.org>

Pictures, live recordings, factual information, and resources including videos, audiovisual programs, posters, books, and educator packets.

The Arachnology Home Page

<http://ufsia.ac.be/Arachnology/Arachnology.html>

The Arachnology Hub of the World Wide Web. A repository and directory of arachnological information on the internet.

World of Reptiles

<http://www.thesnake.org>

Pictures, factual information, and resources on a variety of reptiles.

Publications

You may obtain the following publications by contacting the Missouri Department of Conservation, PO Box 180, Jefferson City, MO 65102-0180, www.conservation.state.mo.us

Snakes of Missouri E448
Common Missouri Spiders E249
Missouri Owls E455

The following publications are available from Acorn Naturalist, PO Box 2423, Tustin, CA 92781-2423, (800)422-8886, <http://acornnaturalists.com>

Swamp Life - A Close-up Look at the Natural World of a Swamp

Greenway. Fantastic photographs and text explore the unique inhabitants of a swamp. Listed in Best Children's Science Books and Films. Ages 7-12. $8.45

Webs of Intrigue, The Realm of the Spider

National Geographic Society. The cast of characters in this 45-minute video represents an array of the 38,000 different species found throughout the world. $19.95

Snakes, A Natural History

Bauchot. Comprehensive survey of snakes, accompanied by hundreds of vivid photographs. Ages 12 and up. $22.95

Owls, A Wildlife Handbook

Long. Unique, practical resource guide combines the best features of a field guide, fact book and folklore collection. Ages 10-adult. $15.95

Discover Bats, A Multimedia Education Kit

Tuttle, Bat Conservation International. Video, teachers guide, student worksheets, reading selections, everything you need to put together an intriguing, meaningful, and fun unit on bats. Ages 9-15. $39.95

One Small Square; Cave

Silver. Looking, listening, and exploring the world of caves through beautiful illustrations, activities, picture field guides, and safety tips. Ages 6-10. $6.75

Media Loan List

You may borrow the following items by contacting our Media Librarian at (573)751-4114 x3837, fax at (573)751-2260 or writing to: Media Librarian, Missouri Department of Conservation, PO Box 180, Jefferson City, MO 65102-0180

Owls

High School-Adult/ 16 minute video
Unusual close-up photography shows viewers a variety of owls nesting, hunting, eating, and rearing their young. An intriguing sequence describes the physical properties that make the owl a fearsome nocturnal hunter.

The Snakes' Tale

Elementary-Adult/20 minutes; all formats
Snakes are included in many old tall tales, but the truth about their behavior is just as intriguing. Focusing on Missouri snakes this film shows how snakes mate, give birth and feed; how they protect themselves from danger; and how they sense the world around them.

Bats: Myth & Reality

Upper Elementary - Adult/ 16 minute video
An introduction to more than 40 species of bats worldwide. You'll see their amazing variety, beauty and sophistication as they catch prey, pollinate flowers and feast on fruits. You will also discover that the bat's fearsome reputation is based on myth not reality.

Fabulous Wetlands

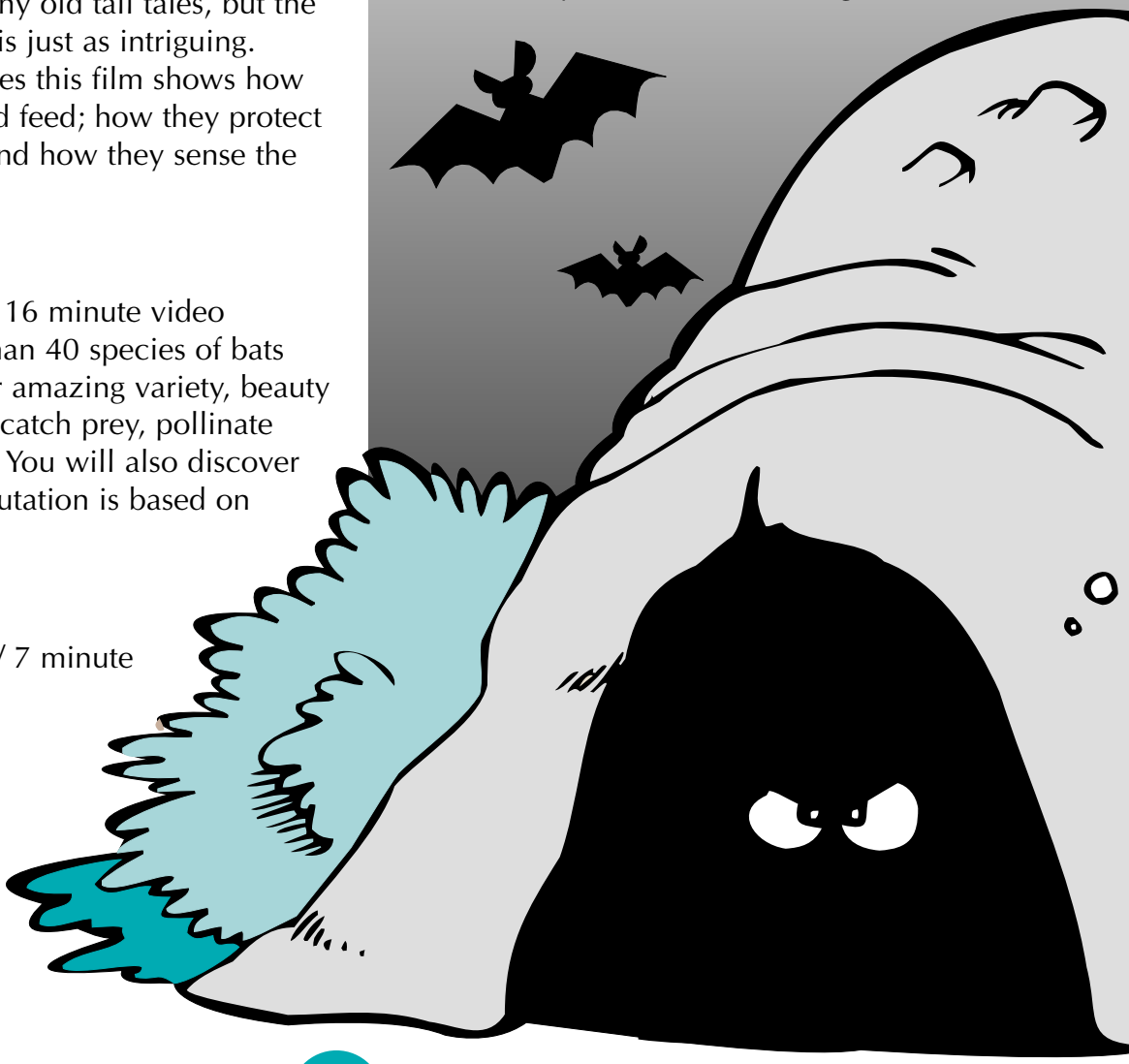
Upper Elementary-Jr. High/ 7 minute video
A wacky scientist presents wetland facts in a funny, upbeat way using "kid language". While standing in wetlands he explains what they are and why they are important.

Caves

33 minute video
Missouri Outdoors television program featuring endangered bats, "A Day in a Cave", cave inventories, and an Ozark Underground Laboratory

Did You Know?
Witch hazel

(*Hamamelis virginiana*)
is a tall, autumn-flowering shrub with clusters of spidery, yellow flowers. The bark and the leaves have long been used as a topical astringent, and the branches are sometimes used by dowsers for locating water.



EE Calendar

Check It Out

<www.conservation.state.mo.us/teacher/workshops> has up-to-date information on the Department of Conservation's teacher workshops. There's something for everyone!

October 4-6

Forest and Glade Ecology
Jerry J. Presley Education Center
7:00 pm Thursday - 3:00 pm Saturday
Ecology and management, classroom connections, hands-on participation, and Project Learning Tree certification. 1 hour graduate/undergraduate credit, Southwest Missouri State University. Contact: Steve Juhlin, 573/468-3335

October 11

Conservation Seeds
University of Missouri, St. Louis
4:30 - 7:30 pm
"Play along" as you learn to use the lesson plans and posters provided in the newly revised MDC "Conservation Seeds" program. Includes a visit to the early childhood outdoor learning center at UMSL. Contact: Nancy Snider, 636/441-4554 ext 245

October 11-15

2001 An EE Odyssey
North American Association for Environmental Education 30th Annual Conference
Little Rock, Arkansas
Exploring capacity, community, biocomplexity, and culture this conference offers See www.naaee.org for complete conference information.

October 19-20

An American Legacy: The Lewis & Clark Expedition
Hannibal LaGrange College, Hannibal MO
6:00 pm Friday - 5:00 pm Saturday
An integrated curriculum-based approach to the significance of the contributions of the Lewis & Clark expedition to our American heritage. Material is for middle and junior high levels. The new Lewis and Clark Discovery Trunk will be showcased. 1 hour graduate credit, Southwest Baptist University.
Contact Karen Armstrong, 660/785-2420

October 23
6:00 to 8:30PM

Bridging The Gap Volunteer Training
Bridging The Gap offices, 435 Westport Road. Kansas City, MO
Come learn about how you can get involved with Kansas City's local, nonprofit environmental education and action organization! Training will cover Bridging The Gap's mission, history and programs as well as all of the ways you can help out. Dinner will be provided. Please RSVP at 816-561-1090 or tracey@bridgingthegap.org if you plan to attend. Visit www.bridgingthegap.org for more information.

Saturday, October 27

Mystery at Hickory Hollow Environmental Curriculum
Saint Louis Zoo
9 am - 3 pm.
Contact: Jim Jordan 314-781-0900, ext. 340

October 27-28, 2001

Getting Into Water
Route 66 State Park, Eureka
This course focuses on the integration of water education in the school curriculum. Participants will experience a Project WET (Water Education for Teachers) workshop. Participants will receive the "Project WET

Curriculum & Activity Guide" and the "Conserve Water Educators' Guide."
Registration fee: $30 (includes field-trip transportation, does not include course tuition). 1 hour credit, Lincoln University
Contact: Joe Pitts, Jim Lubbers, or Bryan Hopkins at the Missouri Department of Natural Resources at telephone 800-361-4827 or (573) 576-6627.

November 3-4, 2001

Energy for Missouri: Today & Tomorrow Columbia
This course will explore current forms of energy use and projections for the changing future of energy in Missouri. The course will discuss the impacts of energy use on both a regional and global level. In addition, the role of energy conservation, alternative fuels, and other innovative practices will be presented.
Registration fee: $30 (includes field-trip transportation, does not include course tuition). 1 hour credit, Lincoln University
Contact: Joe Pitts, Jim Lubbers, or Bryan Hopkins at the Missouri Department of Natural Resources at telephone 800-361-4827 or (573) 576-6627.

Saturdays, Nov. 3 & 17

Ecology and Evolution: Islands of Change Workshop
Saint Louis Zoo
8:30 am - 4:30 pm both days
(1 hour graduate credit option)
Contact: Jim Jordan 314-781-0900, ext. 340

November 9-11

Environmental Education Conference
Join classroom teachers, youth group leaders, resource professionals, interpreters, and others interested in teaching about the environment and natural resources at this dynamic conference held at the fabulous Tan-Tar-A Resort on Lake of the Ozarks. Professional development workshops are offered prior to the conference on Friday, November 9, see page 12 for details. Contact Wayne Hoover, MU Conference Office, 573/882-2429, hooverdw@missouri.edu

November 15

A. Busch Memorial Conservation Area
4:30 - 7:30 pm
"Play along" as you learn to use the lesson plans and posters provided in the newly revised MDC "Conservation Seeds" program. Includes a visit to the early childhood outdoor learning center at UMSL. Contact: Nancy Snider, 636/441-4554 ext 245

November 13 , 6:00 to 8:30PM

Community Educator Training Bridging The Gap offices, 435 Westport Road, Kansas City, MO
Help educate the Kansas City community about the environment and what they can do to help. Volunteers make presentations to schools, clubs, neighborhood organizations, and other area groups. This training session will cover basic public speaking skills and how to give our fun, interactive, educational presentations. Please RSVP at 816-561-1090 or tracey@bridgingthegap.org if you plan to attend. Visit www.bridgingthegap.org for more information.

Did You Know?

Poison ivy

(*Rhus radicans*)
is a nuisance to people but compensates by having considerable wildlife value. The white, waxy berries are a popular food for songbirds during fall migration and in winter when other foods are scarce. Robins, catbirds and grosbeaks especially like the berries. Many birds feed on insects hiding in the tangled vines. Small mammals and deer browse on the poison ivy foliage, twigs and berries.

Paper Facts

Environment Recycled Paper is made from Over 75% recycled paper including 25% post consumer fibre.

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Education Consultant Directory

Conservation education consultants are available to provide consultative services and to offer courses and workshops in conservation education. Addresses, phone numbers and e-mail addresses are for teacher or youth leader use only.

1 Lisa Bonneau
Education Consultant,
N.W. Region
701 NE College Drive
St Joseph MO 64507
(816)271-3100
bonnel@mail.conservation.state.mo.us

2 Greg Collier
Education Consultant,
N.W. Region
Chillicothe Office
15368 LIV 2386
Chillicothe MO 64601
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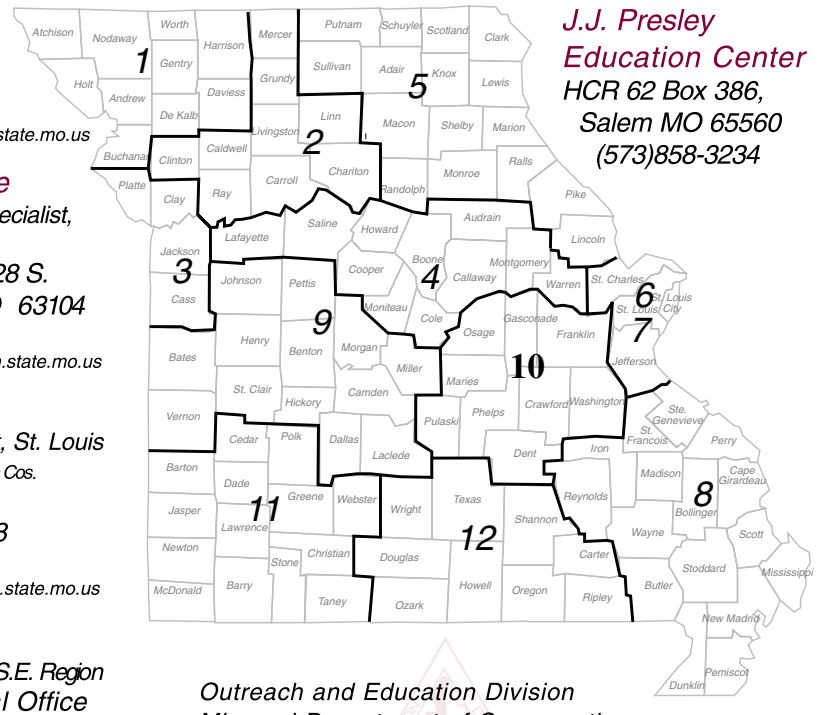

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Conservation Curriculum

IT'S A NEW YEAR!

Conservation Curriculum is a thematic K-12 curriculum insert prepared specifically to enhance *The Resource* and to provide a conservation education supplement to your current curriculum. Each issue will feature conservation information and activities, student copy pages, and teacher resources. Many of the activities featured are submitted by classroom teachers.

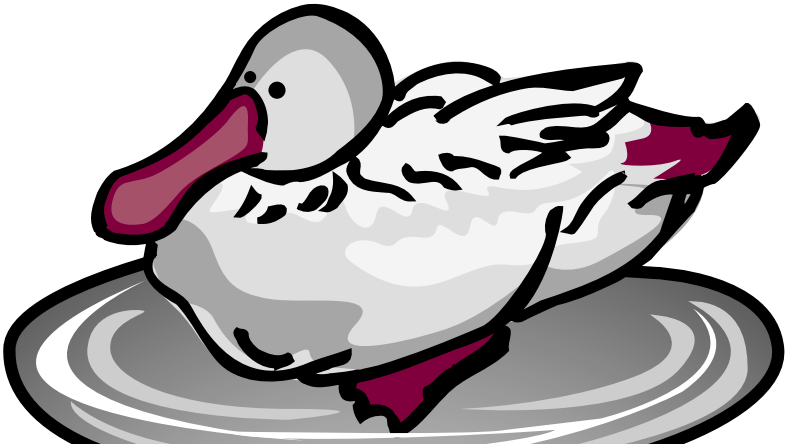
media loan list

Very Elementary Bats
Kindergarten-Fourth Grade/ 7 minute video
Children are naturally curious about bats. This still-image video will introduce them to the diversity of bats and help to dispel myths associated with these mammals.

JUNIOR DUCK STAMP CONTEST

Encourage Your Student Artists to Enter the Jr. Duck Stamp Competition!

Teachers (art teachers as well as teachers of any other discipline) are encouraged to have their students enter Missouri's Junior Duck Stamp and design contest. The competition is sponsored by the US Fish and Wildlife Service, the Missouri Department of Conservation, and the Greater Lake Area Arts Council. The top three entries from each class are eligible for the statewide competition. Teachers will receive certificates for each student who participates (even if they're not in the top three). Entry deadline is **March 15**. Request an entry packet with all the details by writing to: Jr. Duck Stamp Entry Packet, Distribution Center, MDC, PO Box 180, Jefferson City, MO 65109



outside in

Each issue of "Conservation Curriculum" will have a component that can serve as a teacher guide to Outside In. Outside in is a student level insert to the *Missouri Conservationist* magazine. Issues come out in August, November, February and March. Issues match up as follows:

August *Outside In*
October Conservation Curriculum

November *Outside In*
December Conservation Curriculum

February *Outside In*
February Conservation Curriculum

May *Outside In*
April Conservation Curriculum

Schools can request classroom sets (30 copies) of *Outside In* for up to 8 sets or 240 copies per school. Sets are sent to school librarians encouraging teachers to share classroom sets. (To figure the number of sets per school, we ask that teachers plan on 1 copy serving 5 students.) You can order by writing: Missouri Department of Conservation, "Missouri Conservationist" magazine, PO Box 180, Jefferson City, MO 65102-0180.

BATS-Myths & Mysteries

PreK-4

Objectives:

After completing this activity, students will be able to:
1. Describe the main characteristics of bats.
2. Identify a minimum of two benefits of bats to people and the environment.
3. Explain a minimum of three myths associated with bats.

Materials:

drawing paper, crayons, scissors, tape or tacks, poster or photos of bats (optional), bat video (optional)

Background:

Bats are some of the most interesting and least understood animals in the world. Numerous myths are attributed to bats. The nearly 1000 different kinds (species) of bats account for one-quarter of all mammal species. They are the only flying mammals (flying squirrels glide rather than fly). Bats range in size from a mere 1/10 ounce (about the weight of a pencil eraser) to more than 2 pounds with wing spans of up to 6 feet. Missouri's largest bat, the hoary bat, has a wing span up to 16 inches. Missouri bats feed exclusively on insects by scooping them into their wing or tail membranes while in flight and transferring the insects into their mouths. Bats in other parts of the world feed on a variety of foods including fruit, nectar and pollen, and the flesh of animals. Vampire bats, which feed on the blood of warm-blooded animals (e.g., cattle), are found in Mexico, Central America and South America. Because insects are not available during winter months in Missouri, Missouri bats must either hibernate or migrate to warmer places. Missouri caves provide the warmth needed for hibernation. Repeated disturbance by humans can upset this hibernation, resulting in the expenditure of energy, subsequent loss of stored fat, and possible starvation.

Myth: Bats are flying mice.

Fact: While bats and mice are both mammals, bats are not rodents and, in fact, are more closely related to primates (monkeys, people).

Myth: Bats are blind...thus, the saying, "...as blind as a bat."

Fact: Bats have eyes and see quite well — they just don't see colors. Missouri bats primarily detect their prey (insects) through echolocation, a method whereby they emit high frequency sounds (sounds which humans cannot detect) which bounce off various objects (including insects), these sounds returning back to them. Echolocation enables them to accurately locate and catch (or avoid) these objects.

Myth: Bats can get tangled in your hair.

Fact: Bats can detect and avoid objects as fine as a single hair. They are, therefore, unlikely to become entangled in a mass of human hair!

Myth: Bats are dirty and carry rabies.

Fact: Bats are very clean, washing and grooming themselves like cats. Like all mammals, bats can get rabies but they rarely do. It must be remembered that bats are wild animals and should be left alone.

Myth: Bats are worthless animals.

Fact: Bats benefit humans by controlling insect pests that damage agricultural plants and annoy humans (e.g., mosquitos). Bats that feed on fruit help to disperse seeds. Nectar-feeding bats pollinate plants used by humans (e.g., bananas, avocados and cashews). Bacteria in bat guano (bat droppings) is useful in improving soaps, making gasohol and producing antibiotics and fertilizer. Many forms of cave life depend on the nutrients found in guano.

Procedure:

1. Ask students to explain what they know about bats. Write this on the board.
2. Show posters and photos of bats. Discuss the main features of bats.
3. Explain the meaning of a myth (something believed to be true but is not true or based in fact; often in the form of a story or characterization).
4. Discuss the various myths associated with bats. Present the facts that show these myths to be untrue.
5. Tell students that they are going to help create a display (bulletin board or wall mural) that shows the myths associated with bats on the left side of the display and the factual characteristics and benefits of bats on the other side. Allow them to use examples of all kinds of bats (those found in Missouri and those found world-wide).
6. Provide students with materials for creating display items. For representation of bat myths, they may draw: (1) a bat tangled in someone's hair; (2) a bat with no eyes, or; (3) a bat appearing to be dirty and rabid (foaming at the mouth). For factual representations, they may draw: (1) a bat with eyes and ears; (2) a bat with an insect captured in its wing; (3) a bat with an insect or piece of fruit in its mouth, or; (4) a bat sending out a high frequency sound which bounces off an object and returns to the bat's ears (can draw a wavy line to and from the object, the wavy line representing the sound emitted by the bat).
7. Have students, one-at-a-time, add their creations to the display, explaining what they are attempting to illustrate (factual characteristic, benefit or myth).
8. Show video from page C-1 (optional).

Extension:

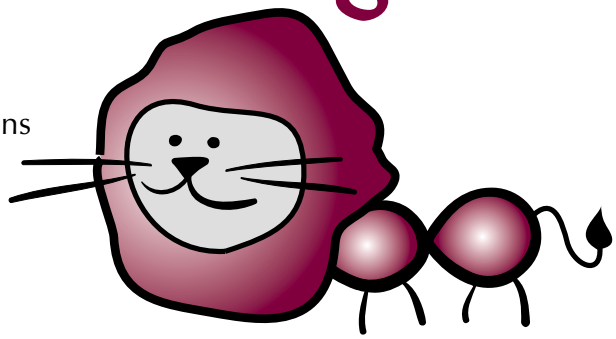
1. Have students use their bat creations to produce two mobiles...one illustrating the myths associated with bats, the other illustrating the factual characteristics and benefits of bats. Use the outline on these 2 pages as a pattern
2. Help students explore the Internet for information on bats. Information on Missouri bats may be found by typing "bats" on the "search" line found in the Web Site for the Missouri Department of Conservation: **http://www.conservation.state.mo.us/**. Other useful links may be found at: (1) http://members.aol.com/bats4kids/ (2) http://endangered.fws.gov/bats/links.htm

OUTSIDE in Guide

5-8

ANTLIONS-aka Doodlebugs

Objectives:



After completing this activity, students will be able to:
1. Describe the main characteristics of larval and adult antlions
2. Explain the feeding habits of antlions.
3. Identify a minimum of one benefit of antlions to people.
4. Explain a minimum of one myth associated with antlions.

Materials:

photos or other visuals of antlion larvae and adults, student handout with antlion drawings, dry sand, shoe boxes or other containers, popsicle sticks, modeling clay or other materials for fashioning antlions and their prey.

Background:

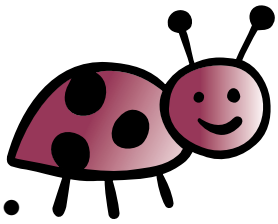
Antlions have captivated the interest of people for many centuries. The earliest descriptions treated antlions as mythical animals which possessed qualities of both ants and lions. Later on, some observers described antlions as small creatures that behave like lions towards ants and ant- like insects. Actually, they are fierce-looking predators that eat ants and other insects. A fully developed antlion larva is about 0.6 inches in length. Antlion larvae form cocoons which yield winged adults resembling damselflies. However, unlike damselflies, adult antlions have longer, prominent, clubbed antennae and, upon closer examination, exhibit a different type of wing venation. Adult antlions are rarely seen because they are most active at night.

The larvae of some antlions hide under bits of debris or wood where they attack passing insects. In sandy areas, some antlions dig shallow cone-shaped pits where they lie in wait at the bottom for an ant or other insect to venture in. The prey slides on the loose sand into the bottom of the pit. The waiting antlion seizes it with piercing-sucking mandibles which inject a paralyzing poison into the victim, allowing the antlion ample time to suck out its juices. If the prey manages to stop its slide down the side of the pit, the antlion accurately hurls a shower of sand at it. This inevitably causes the victim to lose its footing and continue its fateful journey to the bottom. The main benefit of antlions to people is their role in the control of the insect population.

During the pit-making process, the antlion creates spiral-shaped trails in the sand, hence the nickname, “doodlebug.” It builds its pit by pushing itself backward, first drawing a circle on the ground and, then, digging deeper and deeper, in a spiral fashion toward the center. During the process, the excavated sand or soil is thrown out by its head in a highly agitated manner. The pit- building takes only about a quarter-hour. It finishes by burying itself at the bottom with only its head, with opened jaws, exposed.

The antlion is a mysterious character, indeed. The longer the antlion goes without food, the larger it makes its pit. Another oddity is the effect of monthly biological rhythms, antlions digging larger pits at full moon, with a 29.5 day cycle in isolation.

Doodlebugs.....

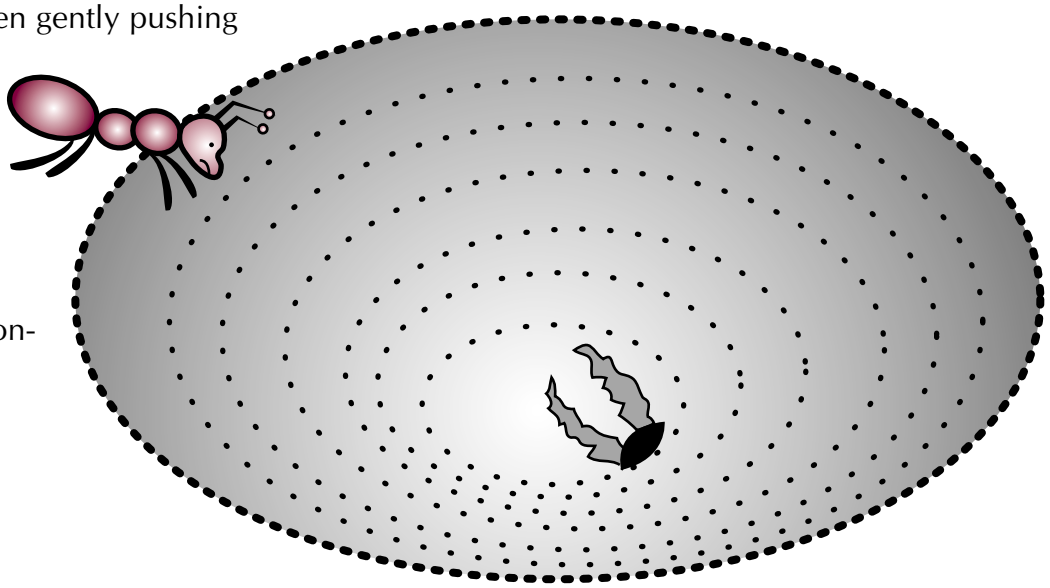


Procedure:

1. Ask students to describe how different kinds of animals obtain their food (e.g., bobcats track down and capture their prey with their claws; eagles snare their prey with talons; snakes seize and swallow their prey; crayfish feed on dead plant and animal matter; woodpeckers use their sharp beaks to search beneath tree bark for insects; spiders build webs to trap their prey). Ask them if they can describe any animals that ambush their prey (e.g., lizards which snatch their prey with long, sticky tongues; trap-door spiders; pit-vipers such as rattlesnakes; angler fish which has a filament extending out from its head, using it to lure its prey within reach).
2. Explain that students are going to investigate antlions—insects having a very unusual method for capturing their prey.
3. Provide students with copies of the antlion drawings.
4. Discuss the many interesting characteristics and habits of antlions.
5. Antlions can be collected by scooping out an entire pit being careful to dig deep enough so as not to crush the antlion. The sand can be sifted to expose the animal. The antlion may be kept in a container of dry sand with live ants released into the sand after the antlion has constructed its pit. After a couple of days of student observation, the antlion(s) should be returned to their original habitat. If there is concern over feeding live prey to antlions, students may use a puff of air or a slender blade of grass to stir the antlion into action.

Extension:

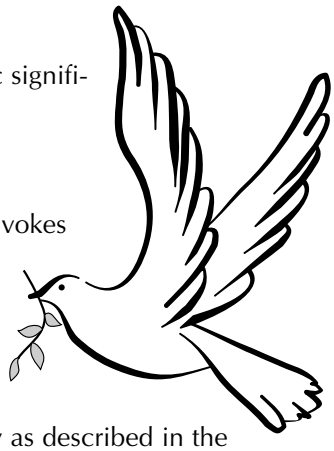
1. Have students search the Web for additional information on antlions. A very comprehensive and interesting site is found at: **http://www.antlionpit.com/antlions.html**.(includes short video action, antlions in culture, and myths attributed to antlions).
2. Form teams of two or three students per team. Challenge each team to set up a demonstration of the activities of an antlion using the materials provided. Each team will need a box of dry sand. One end of the popsicle stick can be fashioned into an antlion body with head and mandibles. Small prey species can be formed from the clay. They can use their "antlion" to build the pit, then gently pushing the "prey" over the edge of the pit. The antlion will snatch the prey with its mandibles, throwing sand on any prey species that fail to slide all the way to the bottom. The teams can be invited to present their demonstrations to the class.



cemeteries-
Links to the Past, Present & Future

9-12

Objective:
After completing these activities, students will be able to discuss the historic, cultural and academic significance of cemeteries.



Background:
The mention of cemeteries elicits different responses from different people. For some, a cemetery invokes images of ghosts, vampire bats, swirling plumes of fog, and other scary entities. For others, cemeteries are places of beauty and comfort. For students, cemeteries can refine their skills in several subject areas.

Procedure:
1. Ask students what they think of when the word "cemetery" is mentioned. Their answers will vary as described in the background information. Ask them why cemeteries elicit this response.
2. Explain that they are going to visit a cemetery to practice their skills in a number of academic areas. (Note: it is advised that if a private cemetery is to be visited, permission by the owners be obtained with an explanation of the activities to be conducted.) Stress the importance of conducting these activities in a respectful manner.
3. Following are some suggestions for activities which can be carried out in a cemetery. Some of these may be conducted or completed in the classroom. Students may be allowed to suggest some activities of their own.

Language Arts:
A. Obituaries: Bring some back issues of the local newspaper to class and have students read some of the more lengthy ones that describe some of the accomplishments of the persons who have died. Have students write their own obituaries as if they were to die: (a) this year; (b) 25 years from now, and; (c) 50 years from now. This exercise will encourage students to consider what they might like to do with their lives and how they would like to be remembered.
B. Epitaphs: An epitaph is an inscription on a tombstone commemorating or epitomizing the deceased person. Have each student copy one epitaph that they find especially interesting and briefly describe what they think this epitaph tells them about the deceased. Beneath this epitaph, write an epitaph (serious or humorous) for themselves, a friend or family member. Read their epitaphs to the class.
C. Experience Summary: Write a short essay on their feelings towards cemeteries before their visit to the cemetery and following their visit.

Math:
A. Average Life Span: Determine changes, if any, in the average life span of people during the past 200 years. One method is to calculate the average life span for ten randomly selected people that died during each one of the following time periods: (1) 1800-1850 (2) 1850-1900 (3) 1900-1950 (4) 1950-2000. Have students attempt to explain the possible reason(s) for the changes observed (e.g., an increase in the average life span over the years). Have them also devise a method for determining if there is a tendency for males or females to live longer.
B. Oldest/Youngest: Have students find:
(1) Name and age of the oldest person at the time of death.
(2) Name and age of the youngest person at the time of death.
(3) Date of the oldest grave (year of death).
(4) Date of the most recent grave (year of death).
C. Geometry: List the different geometric shapes of headstones (spheres, pyramids, rectangles, cylinders or columns, cones, cubes, etc.).

Science:

A. Earth Science: What is the composition of the headstones (limestone, sandstone, marble, granite)? Which kind of headstone material weathers the least? (granite, marble) the most? (sandstone, limestone) Based on the degree of weathering observed, which type of material is likely to be the most expensive? the least expensive?
B. Biology: Determine which kinds of trees, shrubs and flowers dominate the flora of the cemetery. What kinds of wildlife are observed? (squirrels, birds, butterflies, etc.) What is the relation of the abundance and variety of wildlife to the abundance and variety of plant life? Have lichens become established on any of the headstones? If so, on which kind of material (granite, marble, limestone or sandstone) are the lichens most commonly found?

Social Studies:

A. U.S. History: Is there evidence of any wars, tragedies and epidemics? Is there an indication of a person's national origin? How can you find additional information about a person's past history? (county records, Internet, obituaries and news articles from old newspapers on library microfilm, etc.).
B. Economics: Are there any clues to the wealth of the deceased and deceased's family? (size and quality of entombment)
C. Notables: Are there any famous people interred here (dignitaries, sports stars, artists, musicians, movie stars, etc.)? What was their cause of death?

Art:

A. Sketches: Have students sketch some of the more interesting designs and symbols found on the tombstones. Do these represent anything in particular? (doves-peace, willow trees-sorrow, flowers-beauty, etc.) How were the inscriptions, designs and symbols created? (laser, water-jet, sandblasting)
B. Rubbings: Permission to make rubbings should also be made prior to the field trip. Tombstones must be treated with great care and respect. Tombstone rubbings can be made with colored chalk or crayons on rice paper, butcher paper or chart paper. Prior to making the rubbings, cleaning of the tombstone with plain water (no detergents or other chemicals) may be necessary. Chalk rubbings can be protected with chalk spray or hair spray but the spray should be applied away from the tombstone.

Extension:

1. Create a one dimensional tombstone (out of cardboard or poster board) for a plant or animal that has become extinct. The face of the tombstone should include: (a) Common name and scientific name of the extinct species (b) Year that the species was declared extinct (c) designs and symbols (d) appropriate epitaph.

Missouri Conference
on Environmental Education

From Awareness to Action - Renewing Community Through Environmental Education is the theme of the 6th annual Missouri Conference on Environmental Education scheduled for November 9-11, 2001 at the fabulous Tan-Tar-A Resort at Lake of the Ozarks. With an emphasis on personal and professional renewal the conference offers more than 50 different presentations and workshops, field trips, interact sessions, and exciting entertainment. Keynote speaker Delia Clark from Antioch New England Graduate School will enlighten participants to innovative ideas for incorporating environmental education into classrooms and communities. Affordable registration fees, top-notch networking opportunities, and excellent sessions make this one conference you don't want to miss. Scholarships are available. For registration information contact Wayne Hoover at the MU Conference Office, 573/882-2429 or go to http://muconf.missouri.edu

Mission Statement:

The Resource is published in October, December, February and April by the Office of Environmental Education. Its purpose is to provide: current information on conservation and environmental education resources and events; suggestions for integrating environmental subjects into teaching; a forum for environmental education discussion and networking in Missouri; and a clearinghouse for bringing together environmental education resources and partners.

For a free subscription or to submit information to the newsletter, write to: Office of Environmental Education, Missouri Department of Conservation, P.O. Box 180 Jefferson City, MO 65102-0180.

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